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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,415	11/20/2006	Hideki Ohata	Q77832	2945
23373 7590 08/25/2009 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
FANG, SHANE				
ART UNIT		PAPER NUMBER		
1796				
MAIL DATE		DELIVERY MODE		
08/25/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/573,415

**Applicant(s)**

OHATA ET AL.

**Examiner**

SHANE FANG

**Art Unit**

1796

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 12-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-850)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 06/27/08, 05/01/08, 03/27/06

### **DETAILED ACTION**

Some X references listed on ISP are used for 102 rejections of some claims. EP 340826 listed on ISP is not anticipatory, because the disclosed structure contains more than thiophene or pyrrole units.

### ***Election/Restrictions***

The applicant has elected Group I (claims 1-11) without traverse. This restriction is made FINAL.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-7, 9, and 11 rejected under 35 U.S.C. 102(b) as being anticipated by Naitoh et al. (US 4769630) listed on IDS and ISP.

As to claims 1, 3-4, and 7, Naitoh et al. discloses a ( $\pi$ -conjugated) copolymer of poly(4'-methyl-2,2'-thiophenepyrrole) having 50 mol% of thiophene unit and 50 mol% of pyrrole unit (3:25). The polymer film can be doped and form the doped structure as recited in claims 2, 5-6, and 9 (6: 45-65).

As to claim 11, Naarmann et al. is silent on the conductivity. However, In view of the substantially identical composition, it appears that the adduct would have inherently possessed the claimed properties. See MPEP § 2112. In this particular case, no chemical or structural difference is shown between claimed and disclosed doped

poly(4'-methyl-2,2'-thiophenepyrrole). The disclosed poly(4'-methyl-2,2'-thiophenepyrrole) would inherently exhibit claimed conductivity.

3. Claim 1, 3-4 and 7-8 rejected under 35 U.S.C. 102(b) as being anticipated by Feldhues et al. (US 5093033) listed on IDS and ISP.

As to claims 1, 3-4, and 7, Feldhues et al. discloses a ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole having 98 mol% of thiophene unit and 2 mol% of pyrrole unit (by calculation, Ex. 19). Feldhues et al. discloses the structure units are linked in the 2, 5 position (1:45).

As to claim 8, Feldhues et al. discloses the thiophene unit can be 3,4-ethylenedioxy (-OCH<sub>2</sub>CH<sub>2</sub>O- when m=2, claim 1), which one of ordinary skill in the art would immediately envisage.

4. Claim 1-11 rejected under 35 U.S.C. 102(b) as being anticipated by Jonas et al. (US 4959430) listed on IDS and ISP.

As to claims 1, 3-4, and 7-8, Jonas et al. discloses a ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole having 65-98 mol% of thiophene unit and 2-35 mol% of pyrrole unit (by calculation 8:15-26). The thiophene unit can be 3,4-ethylenedioxythiophene (Ex.3), so the one of ordinary skill in the art would at once envisage the copolymer can comprise 2,5-thiophene moiety and 2',5'- pyrrole moiety (out of two possibilities: 2',5' or 3'4'- pyrrole).

As to claims 2, 5-6, 9-11, Jonas et al. is silent on the doped structure as recited in claim 2, but discloses an electrolysis process that is identical to the doping process described in instant specification [0053]. This process involves adding cations such as  $(C_4H_9)_4N^+$  and counter ions such as  $PF_6^-$  under electric field (11:5-30, Table). The reference discloses the doped poly(3,4-ethylenedioxythiophene) tetrafluoroborate having a conductivity of 31 S/cm (12: 7-10). The reference further teaches copolymerization with polypyrrole will stabilize the electrical properties and improve mechanical properties without adverse effect of electrical properties (8:15-15). In light of this, the disclosed process and monomers would inherently feature the doped structures recited in claims 2, 5-6, 9-10 and the electric conductivity as recited in claim 11.

5. Claim 1-7, 9, and 11 rejected under 35 U.S.C. 102(b) as being anticipated by Naarmann et al. (US 4568483) listed on IDS and ISP.

As to claims 1, 3-4, and 7, Naarmann et al. discloses a ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole having 42 mol% of thiophene unit and 58 mol% of pyrrole unit (by calculation, Ex. 3) together with electrolysis that is identical to the doping process described in instant specification [0053]. The pyrrole can be 3,4-diethylpyrrole (2:29), so the one of ordinary skill in the art would at once envisage the copolymer can comprise 2,5-pyrrole moiety and 2',5'-thiophene moiety (out of two possibilities: 2',5' or 3'4'-thiophene). This process involves adding cations such as  $(Bu)_3N^+$  (Ex. 3) and counter ions such as  $PF_6^-$  (3:63-65) under electric field (5: 60-65). The disclosed

process identical to the doping process described in instant specification [0053] and monomers would inherently feature the doped structures recited in claims 2, 5-6, and 9. The resultant conductivity is 42 S/cm (Ex. 3).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 2, 5-6, and 9-11, rejected under 35 U.S.C. 103(a) as being unpatentable over Feldhues et al. (US 5093033) in view of Naitoh et al. (US 4769630)

Disclosure of Feldhues et al. is adequately set forth in ¶3 and is incorporated herein by reference.

Feldhues et al. is silent on the doped structure and conductivity thereof as recited in claims 2, 5-6, and 9-11.

Naitoh et al. discloses a ( $\pi$ -conjugated) copolymer of poly(4'-methyl-2,2'-thiophenepyrrole) having 50 mol% of thiophene unit and 50 mol% of pyrrole unit (3:25). The polymer film can be doped and form the doped structure to increase conductivity (6: 45-65).

Therefore, as to claims 2, 5-6, and 9-11, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole disclosed by Feldhues et al. and applied doping in

view of Naitoh et al. The resultant doped structure would inherently yield increased conductivity as recited in claim 11. One of ordinary skill in the art would have obviously recognized the structure disclosed by Feldhues et al. and Naitoh et al. to feature the conductivity, because Feldhues et al. and Naitoh et al. obviously satisfy all of the material and chemical limitations of the instant invention-see MPEP 2112.01.

8. Claim 8 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Naitoh et al. (US 4769630) in view of Jonas et al. (US 4959430) both listed on IDS and ISP.

Disclosure of Naitoh et al. is adequately set forth in ¶12 and is incorporated herein by reference.

Naitoh et al. is silent on the 3-4-ethylenedioxythiophene moiety as recited in claims 8 and 10.

Disclosure of Jonas et al. is adequately set forth in ¶14 and is incorporated herein by reference. Jonas et al. further discloses using 3-4-ethylenedioxythiophene monomers would have lower rate of self-discharge and can be cyclised more frequently and increase stability to enable polythiophene to be used in aqueous electrolytic systems (6:55-65).

Therefore, as to claims 8 and 10, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole disclosed by Naitoh et al. and replace thiophene moiety with 3-4-ethylenedioxythiophene in view of Jonas et al. The resultant polymer would have

lower rate of self-discharge, so can be cyclised more frequently. Increase stability would also be obtained to enable the resultant polymer to be used in aqueous electrolytic systems.

9. Claim 8 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Naarmann et al. (US 4568483) in view of Jonas et al. (US 4959430) both listed on IDS and ISP.

Disclosure of Naarmann et al. is adequately set forth in ¶5 and is incorporated herein by reference.

Naarmann et al. is silent on the 3-4-ethylenedioxythiophene moiety as recited in claims 8 and 10.

Disclosure of Jonas et al. is adequately set forth in ¶4 and is incorporated herein by reference. Jonas et al. further discloses using 3-4-ethylenedioxythiophene monomers would have lower rate of self-discharge and can be cyclised more frequently and increase stability to enable polythiophene to be used in aqueous electrolytic systems (6:55-65).

Therefore, as to claims 8 and 10, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the ( $\pi$ -conjugated) copolymer of polythiophene-pyrrole disclosed by Naarmann et al. and replace thiophene moiety with 3-4-ethylenedioxythiophene in view of Jonas et al. The resultant polymer would have lower rate of self-discharge, so can be cyclised more frequently. Increase stability



would also be obtained to enable the resultant polymer to be used in aqueous electrolytic systems.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE FANG whose telephone number is (571)270-7378. The examiner can normally be reached on Mon.-Thurs. 8 a.m. to 6:30 p.m. EST.. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Supervisory Patent Examiner, Art Unit 1796